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THE AFTERMATH OF CIVIL WAR*

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Abstract

Using an "event-study" methodology, this paper analyzes the aftermath of civil war in a cross-section of countries. It focuses on those experiences where the end of conflict marks the beginning of a relatively lasting peace. The paper considers 41 countries involved in internal wars in the period 1960-2003. In order to provide a comprehensive evaluation of the aftermath of war, the paper considers a host of social areas represented by basic indicators of economic performance, health and education, political development, demographic trends, and conflict and security issues. For each of these indicators, the paper first compares the post- and pre-war situations and then examines their dynamic trends during the post-conflict period. The paper concludes that, even though war has devastating effects and its aftermath can be immensely difficult, when the end of war marks the beginning of lasting peace, recovery and improvement are indeed achieved.

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The Aftermath of Civil War

I. Introduction

War has devastating consequences for a country, including death, displacement of people, and destruction of public infrastructure as well as physical and social capital. World Bank (2003), one of the most recent and comprehensive reports, concludes that the economic and social costs of civil wars are not only deep but also persistent, even for years after the end of the conflict. However, when the end of war represents the beginning of lasting peace, there are good reasons to believe that recovery, albeit gradual, is possible. This is what neoclassical models of economic growth and convergence would predict and what the evidence of recovery in Europe (after World War II), Korea, and Vietnam, among others, would seem to indicate. The objective of this paper is to contribute some stylized facts on the evidence regarding the economic, social, and political aftermath of civil wars.

The scarce literature that studies the consequences of civil wars has usually focused on the costs *during* conflict. Very few studies analyze the costs of civil war after peace agreements are signed; and if they do, they usually concentrate on health-related issues (see Ghobarah, Huth and Russet 2003). Using a cross-section of countries with well defined pre- and post-war periods, this paper gives a general evaluation of the aftermath of internal wars along basic economic, social, and political dimensions. Although this paper is mainly descriptive, it provides some motivation and evidence on various hypotheses surrounding the consequences of internal wars. It will hopefully induce more specific and analytical research in future work.

Brief review of the literature. There is little controversy on the dire effects of civil and international wars. They kill people, destroy infrastructure, weaken institutions, and erode social trust. Moreover, the destruction of infrastructure and institutions leaves the population under conditions that increase the risk of disease, crime, political instability, and further conflict. Collier et al. (2003) provide a review of the literature on the costs of civil war. For example, Collier (1999) finds that during civil war countries

tend to grow at 2.2 percentage points less than during peace. Using World Health Organization data on 23 major diseases in populations distinguished by gender and age groups, Ghobarah, Huth and Russet (2003) find that civil war increases substantially the incidence of death and disability produced by contagious diseases. Soares (2005) provides an estimation of the welfare cost of violence in a sample of countries applying a willingness-to-pay approach to account for the health consequences of war. For instance, Soares estimates that the civil conflict in Colombia, by reducing life expectancy at birth by 2.2 years, produces a loss of 9.7% of GDP. Other studies focus on the neighboring effects of civil war. Murdoch and Sandler (2002) show that civil wars reduce also growth across an entire region of neighboring countries. Montalvo and Reynal-Querol (2006) explore the influence of refugees from civil wars on the incidence of malaria in the refugee-receiving countries. They show that for each 1000 refugees there are between 2000 and 2700 cases of malaria in the refugee receiving country.

The empirical literature on the aftermath of civil and international war is scarcer. It seems to indicate that countries do recover in the post-conflict period to at least to their pre-war situations. In a cross-country empirical analysis, Przeworski et al. (2000) finds that post-war economic recovery is rapid. Their results indicate that the average rate of growth during the five years following a war is 5.98 percent. They also find that wars cause more damage under dictatorships than under democracies, but, in contrast, recoveries are faster under dictatorships than under democracies. Barro and Sala-i-Martin (1995) explain post-war recoveries --considering the examples of Japan and Germany following World War II-- arguing that whenever a war destroys a given production factor relatively more than other factors, the rate of return of the latter increases, thus creating the forces of convergence that spur rapid growth.

Organski and Kugler (1977, 1980) analyze the economic effects of the two World Wars on a sample of mainly European countries. They find that in the "long run" --15 to 20 years-- the effects of war are dissipated in both losers and winners, typically returning to pre-war growth trends. Miguel and Roland (2005) analyze the impact that the U.S. bombing on Vietnam had on the country's subsequent economic development. They compare the heavily bombed districts to the rest and find that U.S bombing did not have a lasting negative impact on poverty rates, consumption levels, infrastructure, literacy, and

population density, as measured around 2002. Inferring to other cases, they conclude that local recovery from the damage of war can be achieved if "certain conditions" are met.

The paper's methodology. In this paper, we use an "event-study" methodology to analyze the aftermath of war in a cross-section of countries. We focus on those experiences where the end of conflict marks the beginning of a relatively lasting peace. The event-study methodology consists of transforming calendar time into "event time" in order to be able to aggregate and extract meaningful statistics from a collection of experiences that have a given event in common. In our case, the "event" is the occurrence of civil war, and the pre- and post-war periods are defined as periods free of war. These considerations guide the selection and preparation of the sample. The event-study methodology has been used successfully in other contexts (see, for instance, Bruno and Easterly's 1998 application to the analysis of inflation stabilization), but we believe this is the first to apply it to the study of conflict.

Since our objective is to provide a comprehensive evaluation of the aftermath of war, we examine a host of social areas. These are represented by basic indicators of economic performance, health and education, political development, demographic trends, and conflict and security issues. For each of these indicators, the paper first compares the post- and pre-war situations, aiming to determine the existence and extent of a peace dividend. Then, the paper analyzes the dynamic trends of the economic and social indicators during the post-conflict period, examining the nature of the recovery from war, including the possible existence of conflict traps. The comparative analysis is done controlling for country fixed effects and considering the experience of conflict countries both on their own and in comparison with a control group of developing countries.

Basic conclusions. The cost of war is manifest in the failure of conflict countries to make similar progress as other developing countries in key areas of political development and some aspects of health and educational achievement during the war. However, when peace is achieved and sustained, recovery is indeed possible. Virtually all aspects of economic, social, and political development experience gradual improvement in the aftermath of civil war. Progress in social areas is accompanied by a continuous reallocation of public resources away from military expenditures and, above all, a steady rise in average income per capita. An important caveat on this paper is that it

serves only as a broad overview: Its conclusions refer to the typical or average country afflicted by war and reflect mostly a descriptive and statistical examination. Future research should analyze the heterogeneity of post-conflict situations, their causal mechanisms, and the policies that make them successful.

The rest of the paper proceeds as follows. Section II describes the data, their sources, and methodology of analysis. Section III presents and discusses the results, first, on the comparison between the pre- and post-war periods and, second, on the trends of change after the war. Section IV offers some concluding remarks.

II. Data and Methodology

In exploring the patterns of behavior of various economic, social, and political variables in post-war countries, this study focuses on internal (or civil) conflicts. The information on conflicts comes from the Armed Conflict Dataset of International Peace Research Institute, Oslo (PRIO). We group *internal* and *internationalized internal* armed conflict as internal wars.[1] To focus on major conflicts, we limit our analysis to those with the highest intensity level in the PRIO dataset, i.e., more than 1000 battle-related deaths per year during the war.

In an attempt to provide a comprehensive set of stylized facts on post-war transitions, this paper examines the following dimensions: economic performance (GDP per capita growth rate, investment share, government expenditure, military expenditure), health and education (infant mortality, adult female mortality, adult male mortality, primary school enrollment, secondary school enrollment), political development (democracy and autocracy, civil liberties and political rights, law and order), demographic development (old dependency ratio, young dependency ratio, female-male ratio), and other forms of conflict (incidence of terrorist attacks). Detailed description of these variables, including definitions and sources, is provided in Appendix 2.

[1] According to PRIO's definitions, *internal armed conflict* occurs between the government of a state and internal opposition groups without intervention from other states; *internationalized internal armed conflict* occurs when such conflict involves intervention from other states.

Given its wide-ranging coverage of themes and variables, the paper uses an "event-study" methodology that can produce clear and succinct results. This methodology consists of reorganizing the data by converting calendar time into event time.[2] In this particular application, the occurrence of a war is the event that serves to anchor the data. For instance, we define the last year before the start of a war as event year -1, the next-to-the-last year as event year -2, etc. Similarly, the first year after the end of a war is defined as event year 1, the second year as event year 2, etc. In order to reach a favorable compromise between sample size and period extension, we consider 7 years before and after the war event.

The definition of the war event is crucial in our empirical evaluation. We define it such that its pre and post periods can be characterized as relatively free of war. In particular, in order to ensure that we analyze the aftermath following the true resolution of an armed conflict, we require at least ten years of peace after the war. This means that in cases of elongated conflicts with temporary ceasefire periods, the war event would include initial war, (short) interwar peace, and resumption of war. In case a country undergoes two wars with more than ten years of peace in between, the two wars are treated as independent events.[3]

The empirical analysis studies the *typic*al patterns of countries that experienced civil war, examining the *averag*e difference between the post- and pre-war periods and assessing the *average* rates of change in the years after the war. The analysis is made considering the experience of conflict countries both on their own and in comparison with a control group of developing countries. Since some of the variables under consideration may follow world trends (e.g., the wave of democratization in the case of political development variables or the discovery of new vaccines in the case of health indicators), the comparison with the control group is necessary to separate these world trends from the real merits of pacification.

One difficulty in applying the event-study methodology has to do with changes in the sample across event years. Ideally, we should have a constant sample comprised of

[2] Examples of the application of the event-study methodology to other contexts include Bruno and Easterly (1998) and Wacziarg and Welch (2003).

[3] A concern arises when some countries experience external war during the pre- or post-internal conflict periods. In such cases, the periods around the war event cannot be characterized as peaceful. To eliminate this contamination, we exclude these countries from our samples for all variables.

the same countries for all event years, so as to make comparisons meaningful. Unfortunately, a preliminary assessment of the data reveals that for each individual variable, quite a few countries have data only for part of the event periods. For instance, a country may have GDP per capita growth rate data in the first three years after the war, but no more thereafter. In addition, since our sample period is from 1960 through 2003 and we look at seven years both before and after the war, a country could have started the conflict "too early" (e.g., 1962) or ended the conflict "too late" (e.g., 2000), in the sense that it does not have a well-defined pre-war period in the former case, and a well-defined post-war period in the latter case. On the other hand, however, if we do restrict to a perfectly constant sample, we might end up with too few countries included.

In order to achieve a balance between the two extremes, we set our criterion in the following way. For the comparison of pre- and post-war periods, a country will be included in the sample for a particular variable, if it has at least 5 years' observations both before and after the war. For the analysis of the aftermath of conflicts, the data availability restriction is imposed only on event years after the war (i.e., a country does not need to have sufficient pre-war data). Our samples are variable specific --it is absolutely possible that a country meets our requirement for one variable, but fails for another.

Finally, regarding the control groups, they consist of sets of all non-conflict developing countries with available data for each of the variables of interest. Specifically, for each conflict country and event year, the control-group value is the median from the sample of non-conflict developing countries in the calendar year corresponding to the event year. To obtain an overall control-group value per event year, we take the median of the control-group values per conflict country (this is, then, a median of medians). Naturally, the control-group value, and the sample of countries from which it is computed, is specific to each variable under study.

Appendix 1 provides summary information on the various country samples. A country is marked with double asterisk if it is included in the samples for both pre- and post-war comparison and post-war analysis. A single asterisk indicates that this country is used only for post-war evaluation. For example, 17 countries are utilized in the internal war comparison of GDP per capita growth rate before and after the war; these countries

together with other 7 that lack pre-war information are used for evaluation of post-war only. Three variables, i.e., military expenditures, law and order, and terrorist attacks are examined only in the event years after the war due to their lack of available data in the pre-war period.[4]

Altogether, we work with 41 countries involved in internal wars (15 from Africa, 17 from Asia, 3 from Europe, and 6 from Latin America) during the period 1960-2003. Among these countries, six (Burma, Cambodia, Iraq, Liberia, Sri Lanka and Sudan) were entangled in *two* internal conflicts.

III. Results

We carry out two complementary analyses. In the first, we evaluate and compare the central tendency of each variable before and after the war, and with respect to the typical country in the control group (Table 1). In the second, we estimate the average slope (or rate of change) of each variable during the post-conflict period, examine its sign, and determine whether it differs from the corresponding slope in the control group (Table 2). We provide two sets of figures as complements to the tables. Figure 1 plots the median in each event year (seven years before the war and seven years after) for the conflict countries and the control group.[5] Figure 2 plots the medians in each event year after the war (this is not repetitive of Figure 1 because the sample for post-conflict analysis is larger than that for the post-pre war comparisons).

Pre- and post-war comparisons

Visual examination of typical trends before and after the war can be illustrative and motivate more precise statistical analyses. For each indicator in turn, Figure 1 plots the cross-country median in each event year for the conflict and control-group countries. We can distinguish three types of behavior. Some variables (GDP per capita growth, polity2, civil and political rights, female-male ratio, and incidence of terrorism) exhibit a

[4] For example, WDI started to collect military expenditures data (% as central government expenditures) in 1990; and ICRG provides ratings on law and order after 1984.

[5] Since these are plots of the medians, they do not correspond exactly to Table 1 and 2, where the comparison is in the means.

different pattern, including a different level, for after and before the war. Other variables (mortality rates, educational enrollment rates, and dependency ratios) show a change in level that seems to correspond to the continuation of a (declining or increasing) trend established before the war. The final group (investment rate and government expenditures) presents no discernible level change from before to after the war.

Statistical analysis can reveal if average or typical patterns are representative of the sample or if cross-country heterogeneity prevents any summary conclusion. We conduct two statistical tests: Fisher's non-parametric procedure (that tests the equality of medians between the post- and pre-war periods) and fixed effects regressions (that estimate and allow the comparison of the means per period).[6] The results for both are presented in Table 1. We prefer country fixed-effect estimation to simple OLS because it allows controlling for inherent country characteristics that are unrelated to the break of war or the onset of peace. The non-parametric tests only apply to the absolute change between the pre- and post-war periods (and not to the change relative to the control group). Because of this and the general agreement between the non-parametric and parametric tests, we focus the discussion on the fixed-effect regression estimation.

Regarding economic indicators, the average level of GDP per capita growth appears to be significantly larger after than before the war (by about 2.4 percentage points). This result is in line with Przeworski et al. (2000) and Barro and Sala-i-Martin (1995). Moreover, the growth increase in the conflict countries was also significantly larger than that of the control group (which actually experienced a decline in economic growth between the two periods). Interestingly, the increase in economic growth occurs without a corresponding significant change in the level of the capital investment share, which suggests than the increase in growth was mostly due to a recovery in capacity utilization and, possibly, improved factor productivity. Government expenditures (as ratio to GDP) increased by about 1 percentage point from the pre- to the post-war period; however, this increase is not significantly different from that experienced by the control group.

[6] The Fisher test performs a nonparametric K-sample test on the equality of medians (K=2, in our case). It tests the null hypothesis that the 2 samples were drawn from populations with the same median. Its test statistics are the numbers of observations in, respectively, the post- and pre-war periods that are above the overall median. Under the null hypothesis, these numbers should be the same and the underlying distribution is Chi-squared with 1 degree of freedom.

The health and education indicators share some patterns. All of them present an improvement in the post-war period as compared to the pre-war period. (Naturally, improvement means a decrease in mortality rates and an increase in school enrollment rates). When compared with the control group, however, the improvements are less clear cut. For the cases of infant mortality and primary school enrollment, conflict countries improved not only with respect to their pre-war level but also with respect to the gains obtained by the control group. This result may be due in part to the humanitarian help that post-conflict countries receive as compared with the control group. In the case of adult female mortality, the improvement experienced by the conflict countries is not significantly different from that of the control group. For adult male mortality and secondary school enrollment --two variables related to direct combatants--, the improvement in conflict countries fell significantly below that of the control group. The fact that these health and education indicators improved in absolute terms signals the important influence of world trends (for instance reflecting educational and health international campaigns) even for conflict-ridden countries; however, the fact that the improvements fell below international standards reflects the unquestionable cost of war.

Regarding the political variables, there is also evidence of absolute improvement in the post-war period as compared with the pre-war period. Polity 2 –measuring prevalence of democracy and absence of autocracy—presents a higher average level after than before the war. Gastil's measure of civil liberties and political rights (for which a smaller number represents an improvement) also indicates a better situation after than before the war. Nevertheless, for both variables the improvement falls short of what was achieved by the control group. Again, the cost of the war is reflected in the failure of conflict countries to achieve international standards.

Comparing the pre- and post-war periods, the dependency ratios change in a manner similar to a demographic transition: the old population increases while the young population declines, both relative to working age adults. The reduction in the young dependency ratio is similar to that of the control group, but the increase in the old dependency ratio in conflict countries is larger. The female-male ratio also experiences a statistically significant level change: there are more women than men after than before the war; moreover, this change in conflict countries goes in the opposite direction than

the change in the control group. The imbalance created in conflict countries is likely generated by the fact that the majority of fatalities during the war are men.

Finally, regarding the other conflict variable, the incidence of terrorist attacks suffers a level increase from the pre- to the post-war period, but this change is not statistically significant (mostly due to the large variation across countries in this regard).[7]

The aftermath of wars

The previous exercise was directed at assessing level changes that may have occurred after the war *in comparison* to before the war. In this section, we focus on the post-war period to examine the pattern of change when peace begins. Figure 2 gives a preview of the trend of the social and economic indicators in the aftermath of internal wars. For each indicator, it presents the medians of, respectively, the conflict and control-group countries for each of the seven years after the war. The most apparent observation from the figure is the pattern of recovery in all dimensions after the war. In most cases, the indicators show a dynamic pattern that is consistent with gradual social improvement. In the other cases, the improvement appears to occur early in the aftermath of internal wars. There are no clear or significant signs of worsening conditions after the onset of peace. This recovery does not always mean progress *vis-à-vis* the control group, but it is nonetheless remarkable.

Table 2 shows the estimation of the average time trend (or slope) of each indicator for the sample of conflict countries. As before, we use a fixed-effects estimator to allow for different intercepts per country. Table 2 also presents, respectively, the p-values of the tests that the slope in conflict countries is zero or equal to the slope in the control group.

Regarding the economic indicators, GDP per capita in conflict countries has a significantly positive time trend that is also bigger than that of the control group. This gradual improvement is, of course, the result of higher levels of GDP growth in conflict countries after the war. In turn, GDP per capita growth shows no significant linear time trend; its pattern appears to follow an inverted U with best results towards the 4th or 5th

[7] For Terrorist attacks, the corresponding panel in Figure 1 shows not the median but the 75th percentile. The median for this variable is always 0.

year after the onset of peace. The investment rate shows a positive slope, but it is not significantly different from zero or from the slope of the control group. Average investment rates in conflict countries are lower than those in the control group, with no clear signs of converging towards them. It appears, then, that conflict countries are able to approach the control group in terms of GDP per capita in spite of lagging investment rates during the years after the war.

Public finances also experience interesting changes in the aftermath of civil wars. Government expenditures (as ratio to GDP) have a declining time trend that is significantly different from zero and from the trend in the control group. Similarly, military expenditures (as ratio to government expenditures) have a clear and significant declining trend in the aftermath of war. For the average country, military expenditures fall by about 1.35 percentage points of government expenditures per year, while in the control group the change is negligible. In short, after peace is achieved, countries gradually reduce their government expenditures and sharply deemphasize the importance of military expenditures in the use of fiscal resources.

Infant mortality rates as well as primary and secondary school enrollment rates share a significant improving time trend (that is, negative for infant mortality and positive for school enrollment). For infant mortality and primary school enrollment, the average rate of improvement is larger in conflict countries than in the control group. In contrast, for secondary school enrollment, the average rate of improvement in the control group exceeds the progress rate in conflict countries. Surprisingly, adult mortality rates present no statistically significant (declining or rising) trend in the aftermath of internal wars. This is unexpected after considering the rapid progress shown by the *median* conflict country in Figure 2. The inconsistency in the results between the average and the median adult mortality rates is due to the presence of a few extreme country observations, where the mortality rates rose quite sharply. When we use an estimation procedure that limits the influence of outlier observations (not shown in the table), the time trend for both male and female adult mortality rates is significantly negative, rendering a rate of improvement notably larger than that of the control group.

Regarding the political variables, there are some signs of improvement as measured by the democracy index of Polity 2 (positive slope) and Gastil's civil liberties

index (negative slope). However, only in the latter case the slope is statistically significant and, even then, the progress in conflict countries falls below the rate of improvement in the control group. On the other hand, ICRG's index on law and order does show a marked and significant rate of progress in conflict countries, which is much larger than that in the control group. It seems, then, that in the aftermath of civil war, while political rights are slow to advance, police and judicial systems improve at an accelerated rate.

Regarding demographic variables, in the aftermath of war there is a continuation of the demographic transition in conflict countries: The old dependency ratio presents an increasing trend, while the young dependency ratio shows a declining one. The female-male ratio, after increasing during the war, exhibits a statistically significant declining trend in the aftermath, revealing a gradual recovery of the male population from its losses during the war. Regarding the comparison with the control group's behavior, the trend of the young dependency ratio is similar between the conflict and control groups. On the other hand, the trend slopes in the old dependency and female-male ratios are larger (in absolute value) in the conflict group than in the control group, with the difference approaching statistical significance.

Finally, regarding the conflict indicator, the incidence of terrorist attacks decreases significantly in the aftermath of internal wars, as implied by its estimated negative trend. When more complex, nonlinear behavior is allowed (not shown in the table) terrorist attacks seem to follow a quadratic trend with some increase early in the aftermath of war and a subsequent marked decline. The end of the civil war appears to eventually lead to pacification of other types of internal strife.

IV. Conclusions

War has devastating effects, and its aftermath can be immensely difficult. Nevertheless, when the end of war marks the beginning of lasting peace, recovery and improvement are feasible realities.

This paper has not attempted to measure the cost of war in all its human and material dimensions; however, it finds evidence on the negative consequences of war in

the failure of conflict countries to make similar progress as other developing countries in key areas of political development (such as civil liberties and democratic rule) and some aspects of health and educational achievement (such as male mortality and secondary school enrollment). In other, more basic, areas of social development (such as infant mortality and primary school enrollment), conflict countries have been able to partake of the wave of international progress even despite the war. This is arguably a testament to the beneficial impact of medical innovations, educational programs, and the international campaigns to promote them.

Naturally, the problems associated with war do not start when fighting begins. They were present before and may have precipitated, and even generated, the civil conflict. Therefore, it stands to reason that the resolution of war, when it promotes enduring peace, may signal the start of the solution of these problems. The behavior of economic growth gives evidence to this notion: Prior to the war, economic growth is quite low and even negative. After the war, economic growth becomes strongly positive, with an average rate 2.4 percentage points higher than before the war.

The aftermath of war is a period of recovery. Virtually all aspects of economic, social, and political development experience gradual improvement. In some areas (such as infant and adult mortality, primary school enrollment, the correction of demographic imbalances, and the rule of law) this happens at rates higher than those in other developing countries. Progress in social areas is accompanied by a continuous reallocation of public resources away from military expenditures and, above all, a steady rise in average income per capita. One notable exception is democratic rule, where progress in the aftermath of war is too slow to be significant. This contrasts, however, with the progress that is evident in the respect of other civil liberties and political rights and, most importantly, in the perception of law and order. Pacification after civil war does not occur overnight: Terrorist attacks can be quite pervasive in the couple of years following the cessation of hostilities, but even this tends to subside overtime, giving way to a true resolution of the civil war.

This paper is intended as a broad overview of the economic, social, and political conditions in the aftermath of civil war. Its conclusions refer to the typical or average country afflicted by war and reflect mostly a descriptive and statistical examination. The

paper's shortcomings implicitly suggest a rich agenda for future research. This should include an analysis of the heterogeneity in the recovery patterns of conflict countries, a careful examination of the causal mechanisms underlying these patterns, and an evaluation of policies proposed for successful post-conflict recovery, including demobilization of ex-combatants, external intervention and aid, domestic redistributive programs, and institutional reform.

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Table 1: Pre- and post-war comparison

For Fisher's non-parametric test, the statistic used in the post-pre comparisons is the number of observations per period that are above the overall median. For the fixed-effects parametric test, the corresponding statistic is the simple mean per period.

A. Economic

Dependent Variable	Method	Post - Pre	H_0: Post-Pre=0 p-value	Post-Pre control	H_0: Post-Pre=control p-value	Obs./ Countries
a. GDP per capita growth rate	Fisher's test	14	0.06			235/17
	Fixed-effects regression (robust)	0.023810 [0.013]	0.07	-0.010162	0.01	235/17
b. Investment share	Fisher's test	-5	0.24			194/14
	Fixed-effects regression (robust)	0.249112 [0.475]	0.60	-1.202405	0.00	194/14
c. Government expenditure	Fisher's test	2	0.50			166/12
	Fixed-effects regression (robust)	0.9639401 [0.338]	0.01	0.802997	0.64	166/13

B. Health and Education

Dependent Variable	Method	Post - Pre	H_0: Post-Pre=0 p-value	Post-Pre control	H_0: Post-Pre=control p-value	Obs./ Countries
a. Infant mortality	Fisher's test	-61	0.00			294/21
	Fixed-effects regression (robust)	-23.153061 [1.240]	0.00	-20.256123	0.00	294/21
b. Adult female mortality	Fisher's test	-22	0.01			292/21
	Fixed-effects regression (robust)	-32.20164 [5.332]	0.00	-27.715748	0.40	292/21
c. Adult male mortality	Fisher's test	-20	0.01			292/21
	Fixed-effects regression (robust)	-32.96607 [4.932]	0.00	-56.935280	0.00	292/21
d. Primary school enrollment	Fisher's test	14	0.08			292/21
	Fixed-effects regression (robust)	13.206962 [1.679]	0.00	7.295155	0.00	292/21
e. Secondary school enrollment	Fisher's test	44	0.00			276/20
	Fixed-effects regression (robust)	16.680303 [1.235]	0.00	22.257341	0.00	276/20

Table 1 (continued)

C.Political

Dependent Variable	Method	Post - Pre	H_0: Post-Pre=0 p-value	Post-Pre control	H_0: Post-Pre=control p-value	Obs./ Countries
a. Polity2	Fisher's test	45	0.00			234/17
	Fixed-effects regression (robust)	4.205117 [0.503]	0.00	7.152908	0.00	234/17
b. Civil liberties and political rights	Fisher's test	-14	0.01			165/12
	Fixed-effects regression (robust)	-0.852941 [0.130]	0.00	-1.196089	0.01	165/12

D. Demographic

Dependent Variable	Method	Post - Pre	H_0: Post-Pre=0 p-value	Post-Pre control	H_0: Post-Pre=control p-value	Obs./ Countries
a. Old dependency ratio	Fisher's test	13	0.06			333/24
	Fixed-effects regression (robust)	0.0051 [0.001]	0.00	0.001364	0.00	333/24
b. Young dependency ratio	Fisher's test	-20	0.02			333/24
	Fixed-effects regression (robust)	-0.053208 [0.007]	0.00	-0.058417	0.49	333/24
c. Female -male ratio	Fisher's test	20	0.02			333/24
	Fixed-effects regression (robust)	0.007412 [0.002]	0.00	-0.002797	0.00	333/24

E. Conflict

Dependent Variable	Method	Post - Pre	H_0: Post-Pre=0 p-value	Post-Pre control	H_0: Post-Pre=control p-value	Obs./ Countries
a. Terrorist attacks	Fisher's test	26	0.00			265/19
	Fixed-effects regression (robust)	0.633728 [1.421]	0.66	0.000000	0.66	265/19

Note: Numbers in brackets are standard errors.

Table 2: The aftermath of wars

A. Economic

Dependent Variable	Constant	Slope	H_0: Slope=0 p-value	Control Slope	H_0: Slope=Control Slope p-value	Obs./ Countries
a. GDP per capita	6.991707 [0.025]	0.0356669 [0.006]	0.00	0.009571	0.00	167/24
b. GDP per capita growth rate	0.018055 [0.025]	0.004584 [0.005]	0.35	0.001124	0.48	166/24
c. Investment share	10.044734*** [0.466]	0.141036 [0.111]	0.21	0.147305	0.96	129/19
d. Government expenditure	13.08622*** [0.414]	-0.267081*** [0.090]	0.00	-0.121519	0.11	140/20
e. Military expenditure	19.591913*** [2.063]	-1.354895*** [0.415]	0.00	-0.009892	0.00	26/5

B. Health and Education

Dependent Variable	Constant	Slope	H_0: Slope=0 p-value	Control Slope	H_0: Slope=Control Slope p-value	Obs./ Countries
a. Infant mortality	85.637087*** [0.894]	-1.114909*** [0.192]	0.00	-0.787517	0.09	202/29
b. Adult female mortality	288.0862*** [3.517]	-0.8443256 [0.819]	0.30	-2.584219	0.04	195/28
c. Adult male mortality	361.3353*** [3.280]	-0.6355075 [0.790]	0.41	-1.929361	0.09	195/28
d. Primary school enrollment	82.061437*** [1.873]	2.063879*** [0.478]	0.00	0.471630	0.00	189/27
e. Secondary school enrollment	33.854883*** [0.910]	0.820197*** [0.213]	0.00	2.398851	0.00	187/27

C. Political

Dependent Variable	Constant	Slope	H_0: Slope=0 p-value	Control Slope	H_0: Slope=Control Slope p-value	Obs./ Countries
a. Polity2	-2.078480*** [0.469]	0.058537 [0.092]	0.53	0.280931	0.02	181/26
b. Civil liberties and political rights	5.445584*** [0.101]	-0.057860** [0.023]	0.01	-0.036855	0.36	202/29
c. Law and order	1.839708*** [0.204]	0.175824*** [0.042]	0.00	0.021914	0.00	104/15

Table 2 (continued)

D. Demographic

Dependent Variable	Constant	Slope	H_0: Slope=0 p-value	Control Slope	H_0: Slope=Control Slope p-value	Obs./ Countries
a. Old dependency ratio	0.064586*** [0.001]	0.000297** [0.000]	0.00	0.000083	0.15	202/29
b. Young dependency ratio	0.785480*** [0.005]	-0.005590*** [0.001]	0.00	-0.004465	0.35	202/29
c. Female-male ratio	1.009116*** [0.001]	-0.000656** [0.000]	0.02	-0.000247	0.15	202/29

E. Conflict

Dependent Variable	Constant	Slope	H_0: Slope=0 p-value	Control Slope	H_0: Slope=Control Slope p-value	Obs./ Countries
a. Terrorist attacks	8.375861*** [2.030]	-1.046904*** [0.398]	0.01	0	0.01	202/29

Note: Numbers in brackets are standard errors.
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Pre- and post-war comparison
Sample median by event year

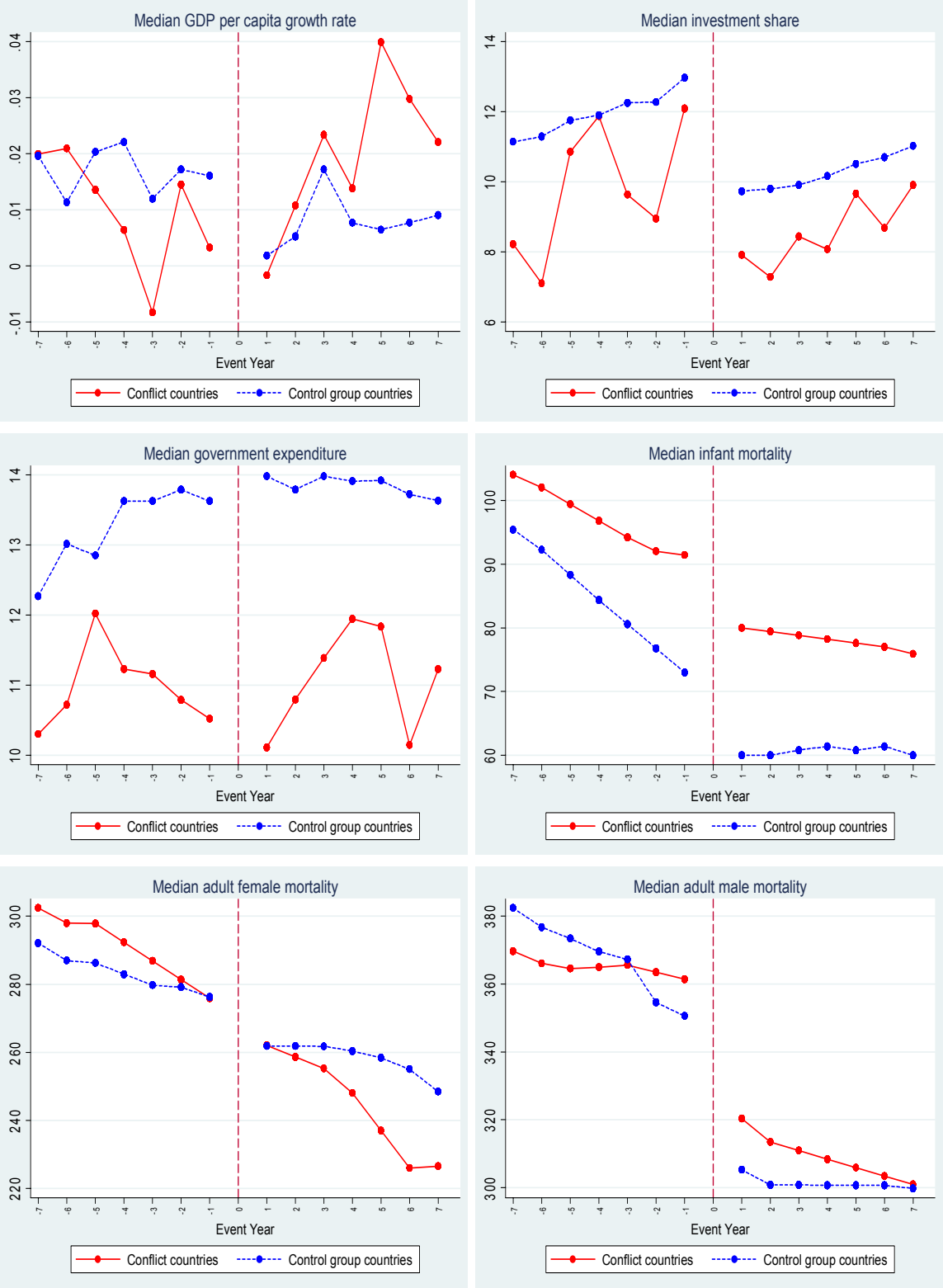


Figure 1 (continued)

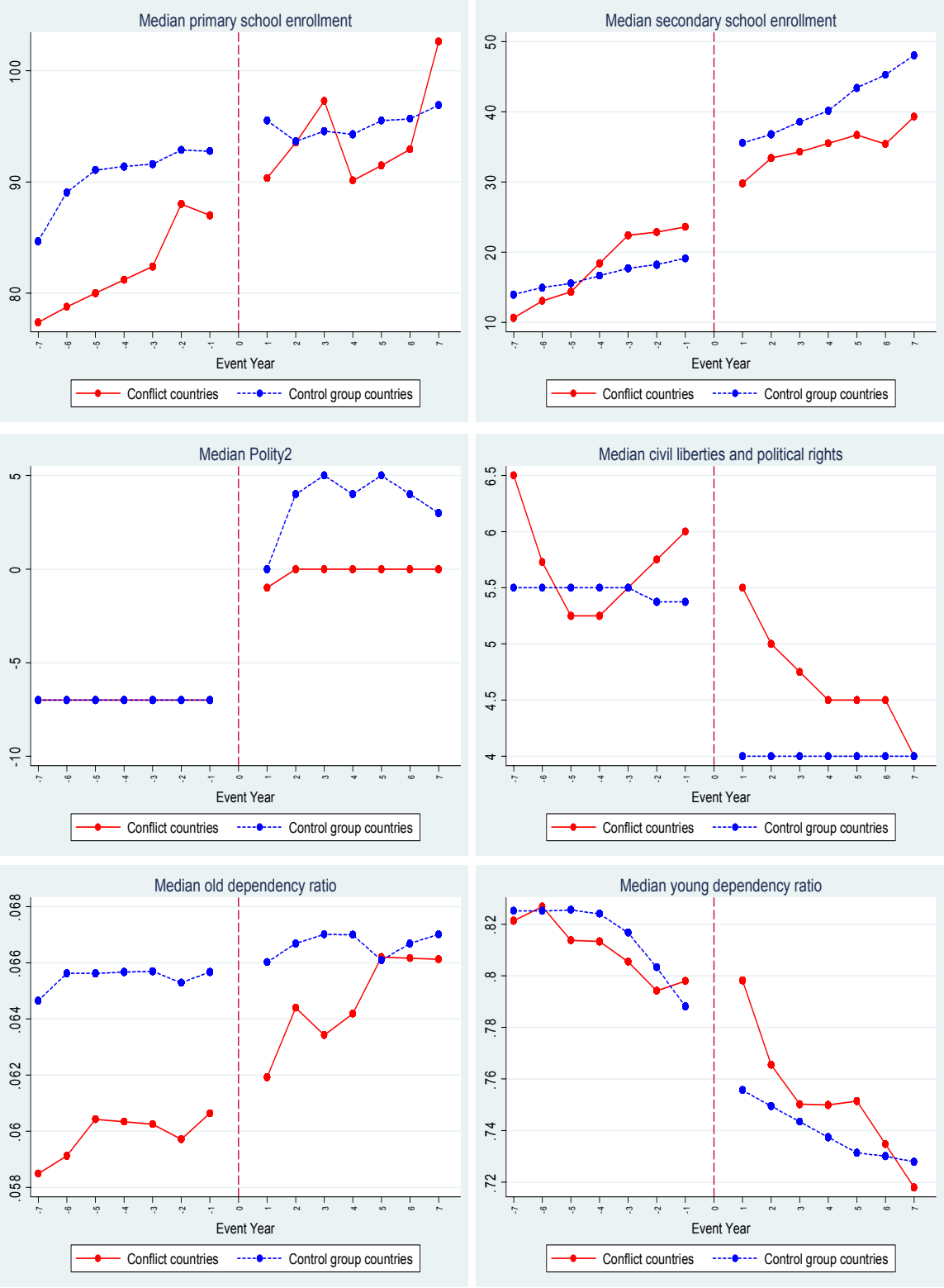


Figure 1 (continued)

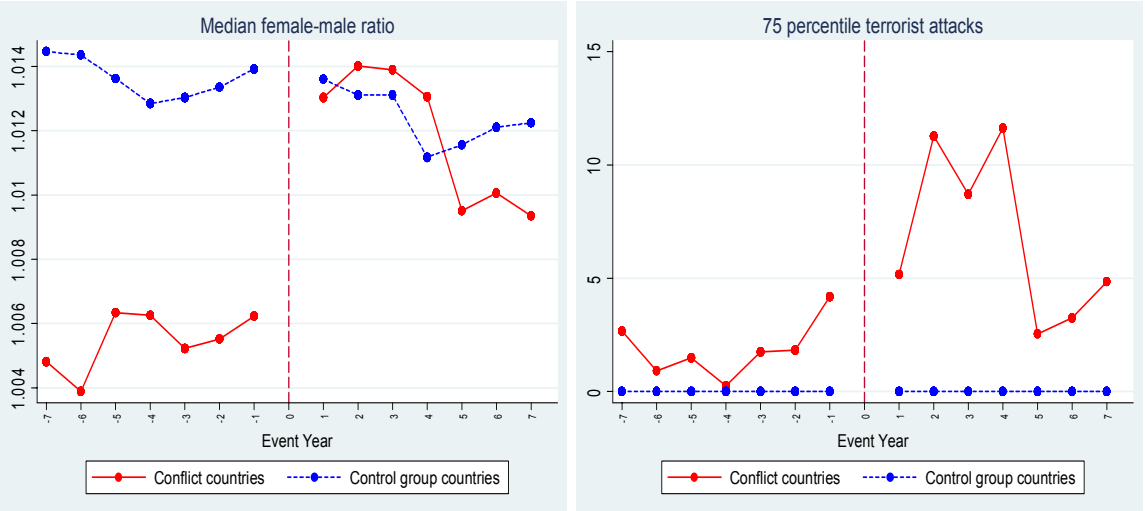


Figure 2: The aftermath of conflicts
Sample median by event year

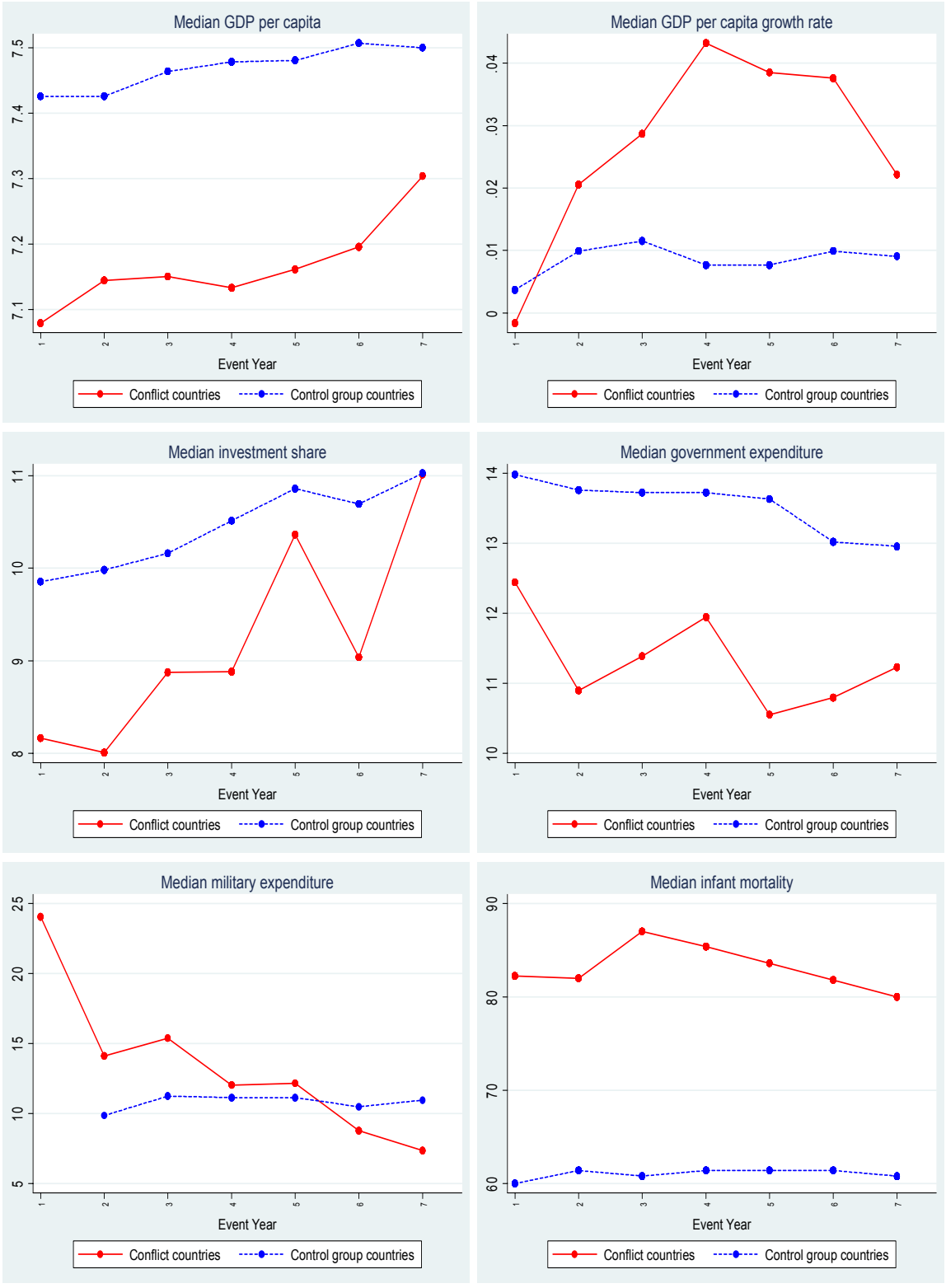


Figure 2 (continued)

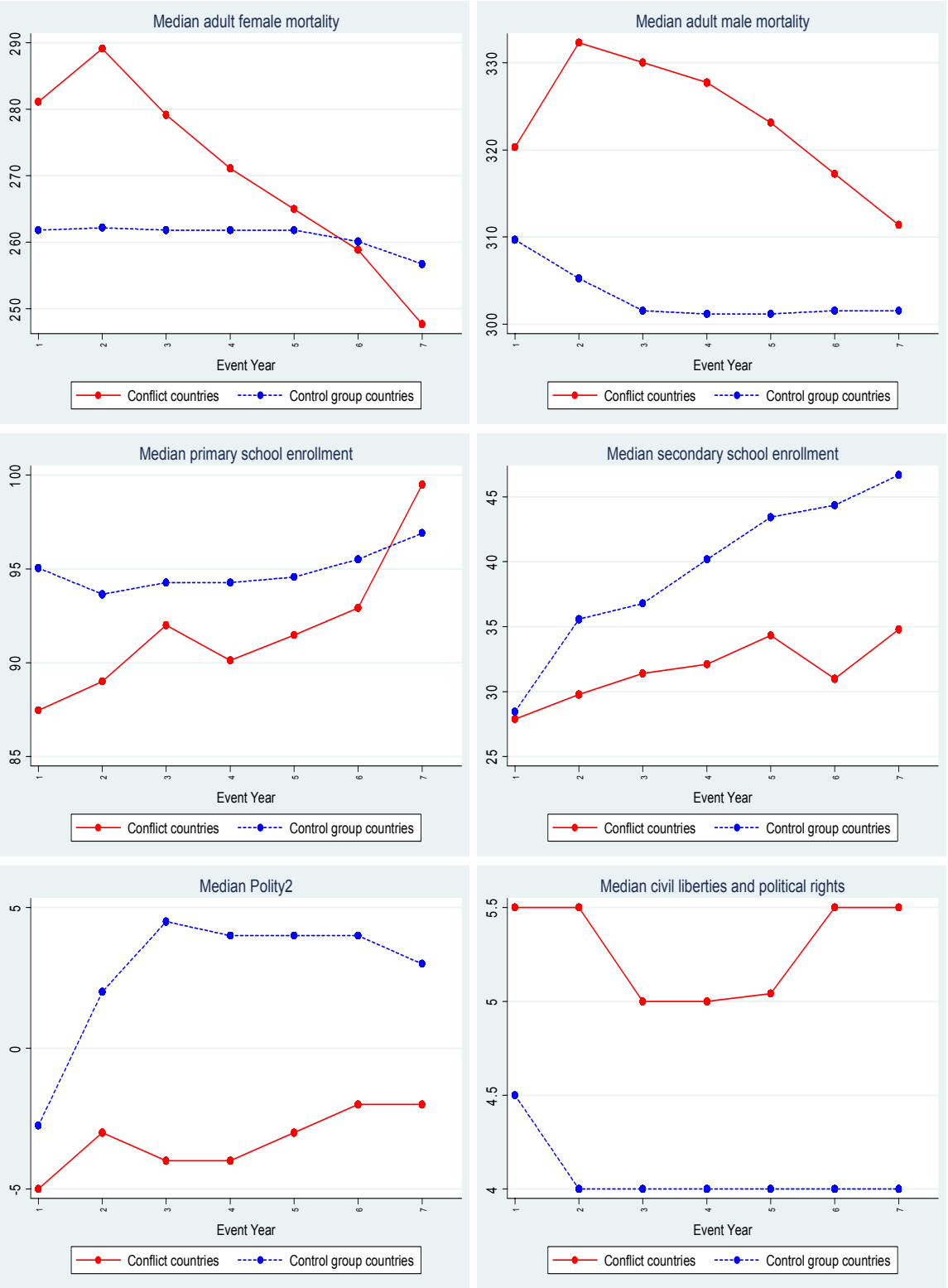
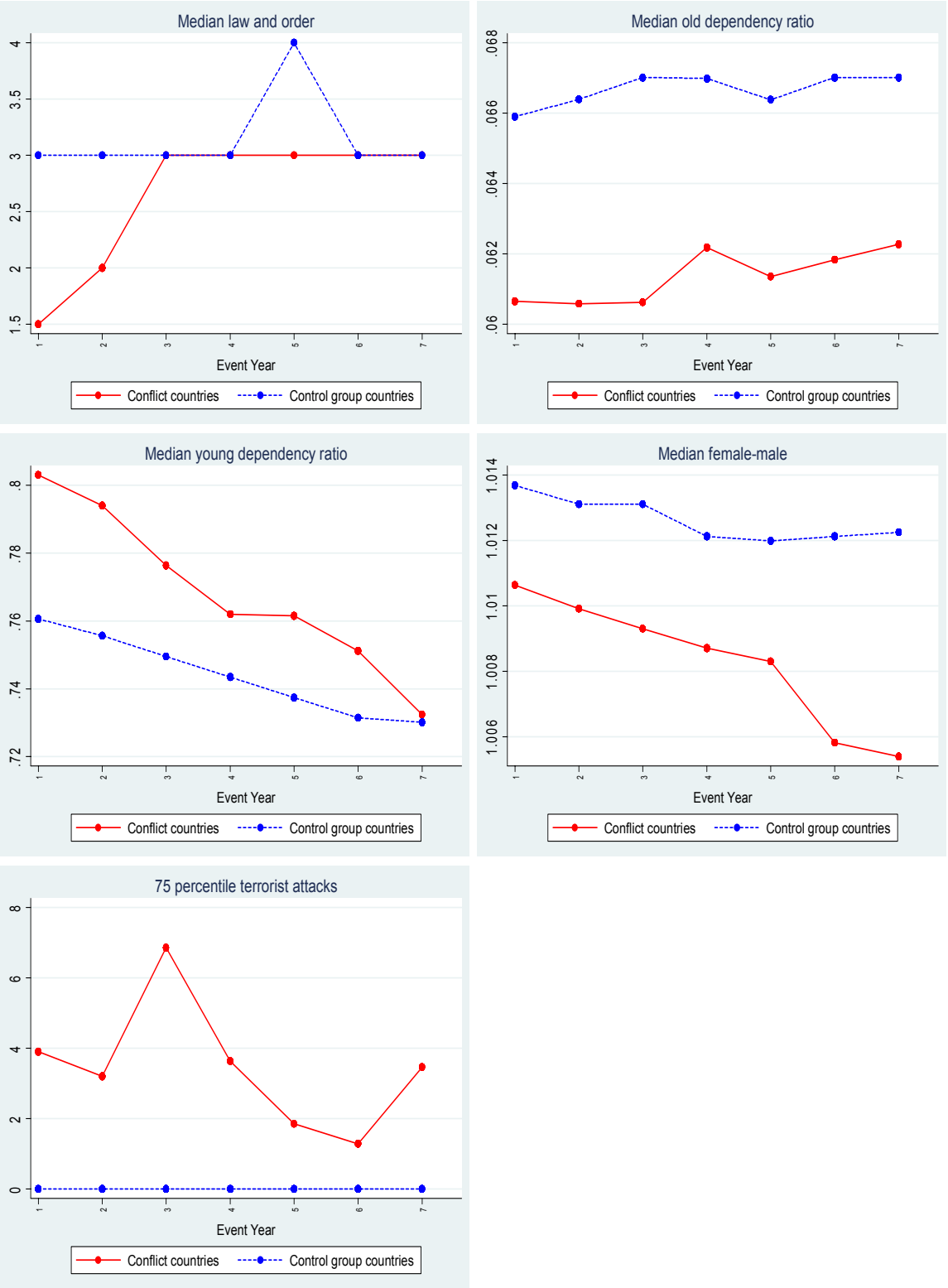


Figure 2 (continued)



Appendix 1: Data sample

Country	War years	*Economic*				*Health and Education*				
		GDP per capita growth rate	Invest-ment share	Govt expen-diture	Military expen-diture	Infant mortality	Adult female mortality	Adult male mortality	Primary school enrollment	Secondary school enrollment
Afghanistan	1978 - 2001									
Algeria	1993 - 2001									
Angola	1975 - 2001									
Argentina	1975									
Azerbaijan	1992 - 1994	*	*	*	*	**	**	**	**	**
Bosnia and Herzegovina	1992 - 1993	*				**	**	**		
Burma	1961 - 1978	*				*	*	*	*	*
Burma2	1992 - 1994	**				**	**	**	**	**
Burundi	1998 - 2002									
Cambodia	1967 - 1978					*	**	**	**	*
Cambodia2	1989			*		**	**	**	**	**
Chad	1965 - 1990	*	**	**		*	**	**	**	**
Colombia	1989 - 2002									
El Salvador	1981 - 1990	**	**	**		**	**	**	**	**
Ethiopia	1974 - 1991									
Guatemala	1969 - 1987	**	**	**	*	**	**	**	**	**
India	1988 - 2003									
Indonesia	1975 - 1978	**	**	**		**	**	**	**	**
Iran	1979 - 1982									
Iraq	1961 - 1975									
Iraq2	1988 - 1991					*	*	*	*	*
Laos	1960 - 1973					*	*	*	*	*
Lebanon	1976 - 1990	*	*	*		**	**	**	**	**
Liberia	1990 - 1992	**				**	**	**	**	**
Liberia2	2003									
Morocco	1975 - 1980	**	**	**		**	**	**	**	**
Mozambique	1981 - 1992	**	**	*		**	**	**	**	**
Nepal	2002 - 2003									
Nicaragua	1978 - 1988	**	**	**	*	**	**	**	**	**
Nigeria	1967 - 1970	**	**	**		**	*	*	**	**
Pakistan	1971 - 1974	*	*	*		*	*	*	*	*
Peru	1981 - 1993	**	**	**		**	**	**	**	**
Philippines	1978 - 1992	**	**	**		**	**	**	**	**
Russia	1995 - 2001									
Rwanda	1991 - 2001									
Sierra Leone	1998 - 1999									
Somalia	1989 - 1992					**	**	**		
South Africa	1980 - 1988	**	**	**	*	*	**	**	**	**
Sri Lanka	1971 - 1971	**	**	**		**	*	*	**	**
Sri Lanka2	1989 - 2001									
Sudan	1963 - 1972	*		*		*	*	*	*	*
Sudan2	1983 - 2003									
Syria	1982 - 1982	**	**	**		**			**	**
Tajikistan	1992 - 1993	**	*	**		**	**	**	*	*
Uganda	1979 - 1991	**	**	*		**	**	**	**	**
Yemen	1994	**	*	*	*	**	**	**	**	**
Yugoslavia	1991 - 1999									
Number of country-war observations	pre-post	17	14	13	0	21	21	21	21	20
	post only	24	19	21	5	29	28	28	27	27

Appendix 1 (continued)

Country		*Political*			*Demographic*			Conflict
		Polity 2	Civil liberties and political rights	Law and order	Old dependency ratio	Young dependency ratio	Female-male ratio	Terrorist attacks
Afghanistan								
Algeria								
Angola								
Argentina								
Azerbaijan		*	*		**	**	**	**
Bosnia and Herzegovina			*		**	**	**	**
Burma		*	*		*	*	*	*
Burma2		**	**	*	**	**	**	**
Burundi								
Cambodia			*		**	**	**	*
Cambodia2		*	**		**	**	**	**
Chad		**	*		**	**	**	*
Colombia								
El Salvador		**	**	*	**	**	**	**
Ethiopia								
Guatemala		**	*	*	**	**	**	*
India								
Indonesia		**	*		**	**	**	**
Iran								
Iraq								
Iraq2		*	*	*	*	*	*	*
Laos		*	*		*	*	*	*
Lebanon			*	*	**	**	**	**
Liberia		**	**	*	**	**	**	**
Liberia2								
Morocco		**	*		**	**	**	**
Mozambique		**	**	*	**	**	**	**
Nepal								
Nicaragua		**	**	*	**	**	**	**
Nigeria		**	*		**	**	**	*
Pakistan		*	*		*	*	*	*
Peru		**	**	*	**	**	**	**
Philippines		**	**	*	**	**	**	**
Russia								
Rwanda								
Sierra Leone								
Somalia		**	**	*	**	**	**	**
South Africa		**	**	*	**	**	**	**
Sri Lanka		**	*		**	**	**	*
Sri Lanka2								
Sudan		*	*		*	*	*	*
Sudan2								
Syria		**	**	*	**	**	**	**
Tajikistan		*	*		**	**	**	**
Uganda		**	**	*	**	**	**	**
Yemen		*	*	*	**	**	**	**
Yugoslavia								
Number of country-war observations	pre-post	17	12	0	24	24	24	19
	post only	26	29	15	29	29	29	29

Note:

Countries marked with double asterisks are in the sample for Table 1 and 3.

Countries marked with a single asterisk are in the sample for Table 3.

Appendix 2: Variables' definitions and sources

Variables	Definition	Source
Internal/external wars	Conflicts resulting in more than 1000 battle-related deaths per year for every year in the period	International Peace Research Institute, Oslo (PRIO)
GDP per capita growth rate	Real GDP per capita growth rate	Authors' calculation with data from Penn World Tables 5.6 and World Bank's World Development Indicatiors
Investment share	Investment share of real GDP per capita (unit %)	Penn World Tables 6.1
Government expenditure	General government final consumption expenditure (% of GDP)	World Bank's World Development Indicatiors
Military expenditure	Military expenditure (% of central government expenditure)	World Bank's World Development Indicatiors
Infant mortality	Mortality rate, infant (per 1,000 live births)	World Bank's World Development Indicatiors
Female mortality	Mortality rate, adult, female (per 1,000 female adults)	World Bank's World Development Indicatiors
Male mortality	Mortality rate, adult, male (per 1,000 male adults)	World Bank's World Development Indicatiors
Primary school enrollment	School enrollment, primary (% gross)	World Bank's World Development Indicatiors and Barro & Lee Dataset
Secondary school enrollment	School enrollment, secondary (% gross)	World Bank's World Development Indicatiors and Barro & Lee Dataset
Polity2	A combined polity score (computed by subtracting the autocracy score from the democracy score) An additive twenty-one-point scale (-10 to10), with 10 representing the highest degree of democracy and -10 the lowest	Polity IV
Civil liberties and political rights	Civil liberties and political rights = (political rights + civil liberties)/2 In Freedom House, countries whose combined average ratings for political rights and civil liberties fell between 1.0 and 3.0 (i.e., $1.0 \leq avg\_pr\_cl < 3.0$) were designated "free", between 3.0 and 5.5(i.e., $3.0 \leq avg\_pr\_cl < 5.5$) "partly free", and between 5.5 and 7.0 (i.e., $5.5 \leq avg\_pr\_cl \leq 7.0$) "not free".	Freedom House
Law and order	Measured on a 0-6 scale, with 6 representing the best quality of law and order and 0 the lowest	International Country Risk Guide (ICRG) Monthly data for June is selected to represent the whole year.
Old dependency ratio	Old dependency ratio = population over age 65 /population between age15-64	Authors' calculation from World Bank's World Development Indicatiors
Young dependency ratio	Young dependency ratio = population under age 14 /population between age15-64	Authors' calculation from World Bank's World Development Indicatiors
Female-male ratio	Female-male ratio = female population / male population	Authors' calculation from World Bank's World Development Indicatiors
Terrorist attacks	Number of terrorism incidents per 10 million people A terrorism incident occurs in that country if the country is the end location of the incident or the start location of hijacking.	ITERATE